

# **Advanced Technology Demonstration**

## **Rapidly Installed Breakwater (RIB) System Update**

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**ATD Manager**

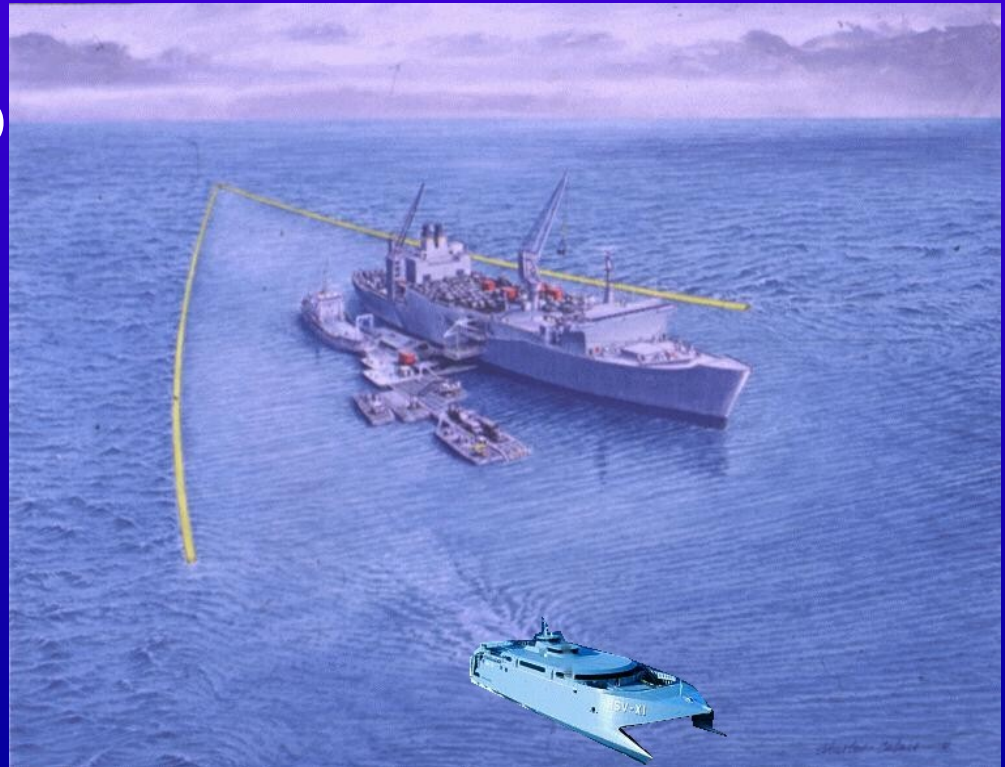
**Initially approved as ATD by ASFWG,  
AUG 98**

**Approved by WTC, June 2001**

**Co-managers: FBRICE & MSRI**

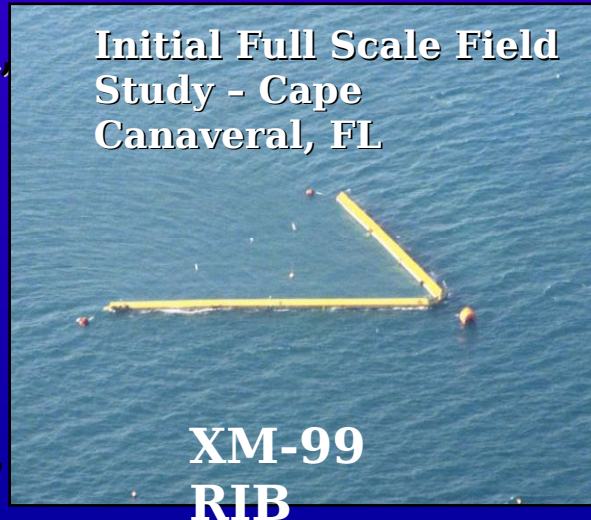
# AUSTERE ISBs

- Options available when other ISB alternatives are unavailable:
  - LMSR w/ RIB
    - ENTIRE IBCT O
    - ONE LMSR





# CONDENSED HISTORY OF RIB



# **MILITARY OPERATIONAL REQUIREMENTS - RIB**

**A JLOTS-Relevant RIB must feature:**

- **RAPID EMPLOYMENT**
- **ARRIVE WITH HLPS**
- **SS3 REDUCED TO SS2**
- **SS5 SURVIVABLE**
- **SS3 EMPLOYMENT CAPABILITY**

**RIB ORD Approved 17 Jan 2000**



# RIBS **Integrated Concept** **Team**

- TACOM
- TARDEC
- HQ, USACE
- USAE Coastal Hydraulic Lab
- USA Transportation School
- USA Engineer School/MSBL**
- Joint Staff
- HQ, TRADOC, CSS Directorate
- OPNAV
- 74th EN Dive Team
- ODCSLOG
- ODCSOPS
- CASCOM
- Force Projection Battle**
- Support Element**
- NSWC, Carderock Div
- 7<sup>th</sup> Transportation Gro
- T&E Community

# RIBS ATD Exit Criteria

## Exit Criteria - Enhanced Coastal Trafficability and Sea State Mitigation

### *Part I: Rapidly Installed Breakwater System (RIBS)*

Description	Criteria 1	Criteria 2
Setup and Employment of RIBS after Arrival Onsite	48 Hours	24 Hours
Demonstrated RIBS Performance in		
Wave Height Reduction	50%	65%
Survivability of RIBS in Storms	Sea State 5	Sea State 6
Transportable and Employable Using Existing Assets	N/A	N/A



# ATD MILESTONES

- R 1999 Structural Requirements for RIBS
- R 2000 Mooring Requirements for RIBS
- R 2000 Engineering Design for Prototype RIBS
- R 2001 Fabricate 1st Prototype ATD-RIBS Segments
- R 2001 Field Deploy 1st Prototype ATD-RIBS Segments
- C 2001 Plan and Materials for Beach Stabilization
- R 2002 Incorporate Lessons Learned in Final Design
- R 2002 Field Deploy Final Prototype ATD-RIBS
- R 2002 Deploy Final Prototype ATD-RIBS w/ planned exercise
- C 2002 Demonstrate Beach Stabilization w/ planned exercise

# TECHNICAL ACCOMPLISHMENTS

Effectiveness of previous concepts was limited to wave periods in range of 3-4 seconds (Sea State 2)

Operability of Floating Breakwaters has been extended to wave periods up to 8 seconds by new design concept (Sea State 4)

“Hard” Structures are extremely large, heavy, and difficult to handle/deploy, particularly in the stream

RIB “soft” structure weighs much less, is compact for shipment, and is relatively easy to deploy

“Hard” Structures are very susceptible to storm damage and fatigue

Problem with exceeding the allowable stresses in metal was overcome by shifting to a high-strength fabric design and moment-carrying joints to allow Sea State 5 survivability

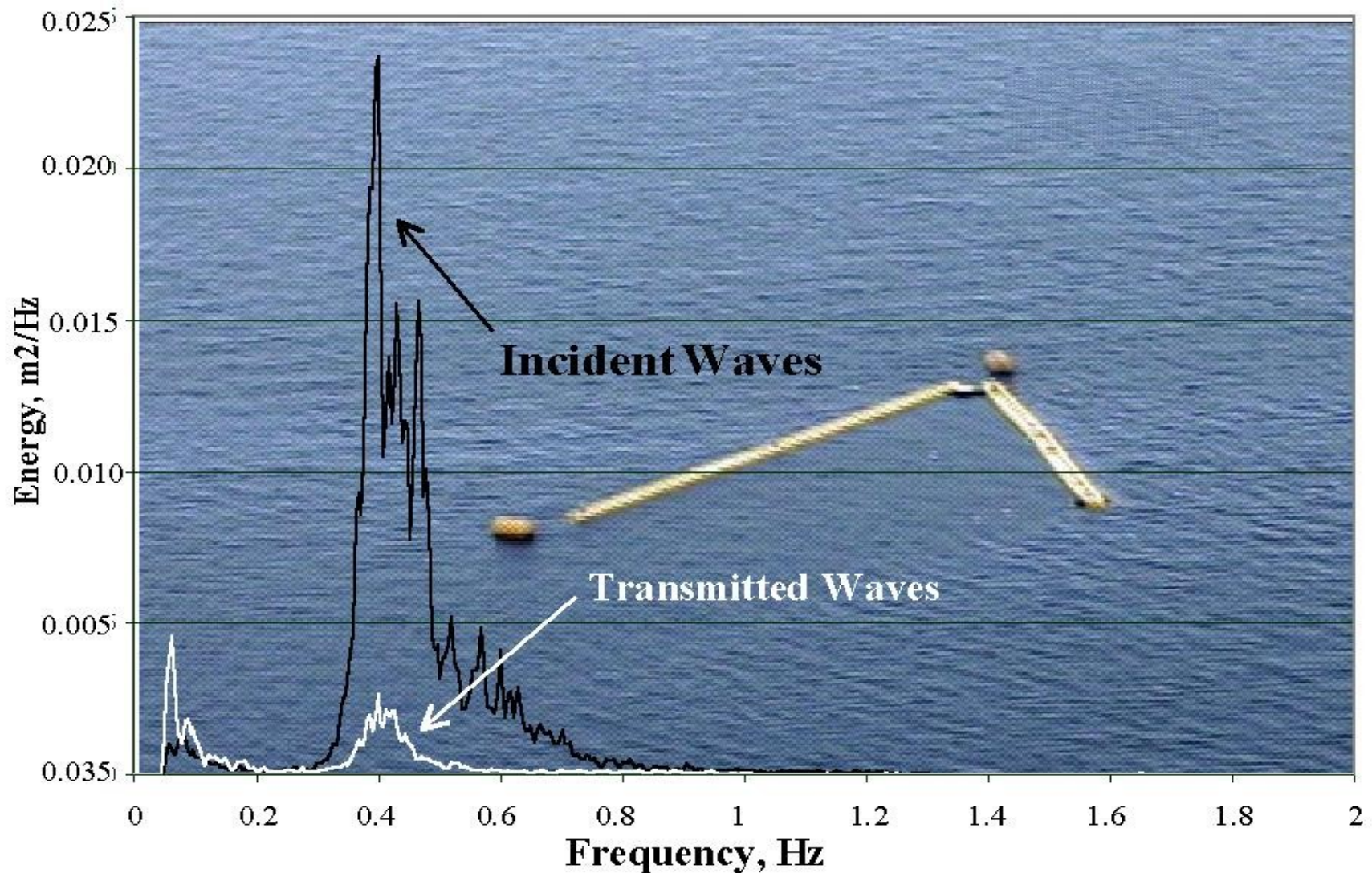
Scope of conventional mooring systems severely limits operating area within a deployed RIB system

“Seaflex” mooring system allows use of almost entire interior area for vessel operations

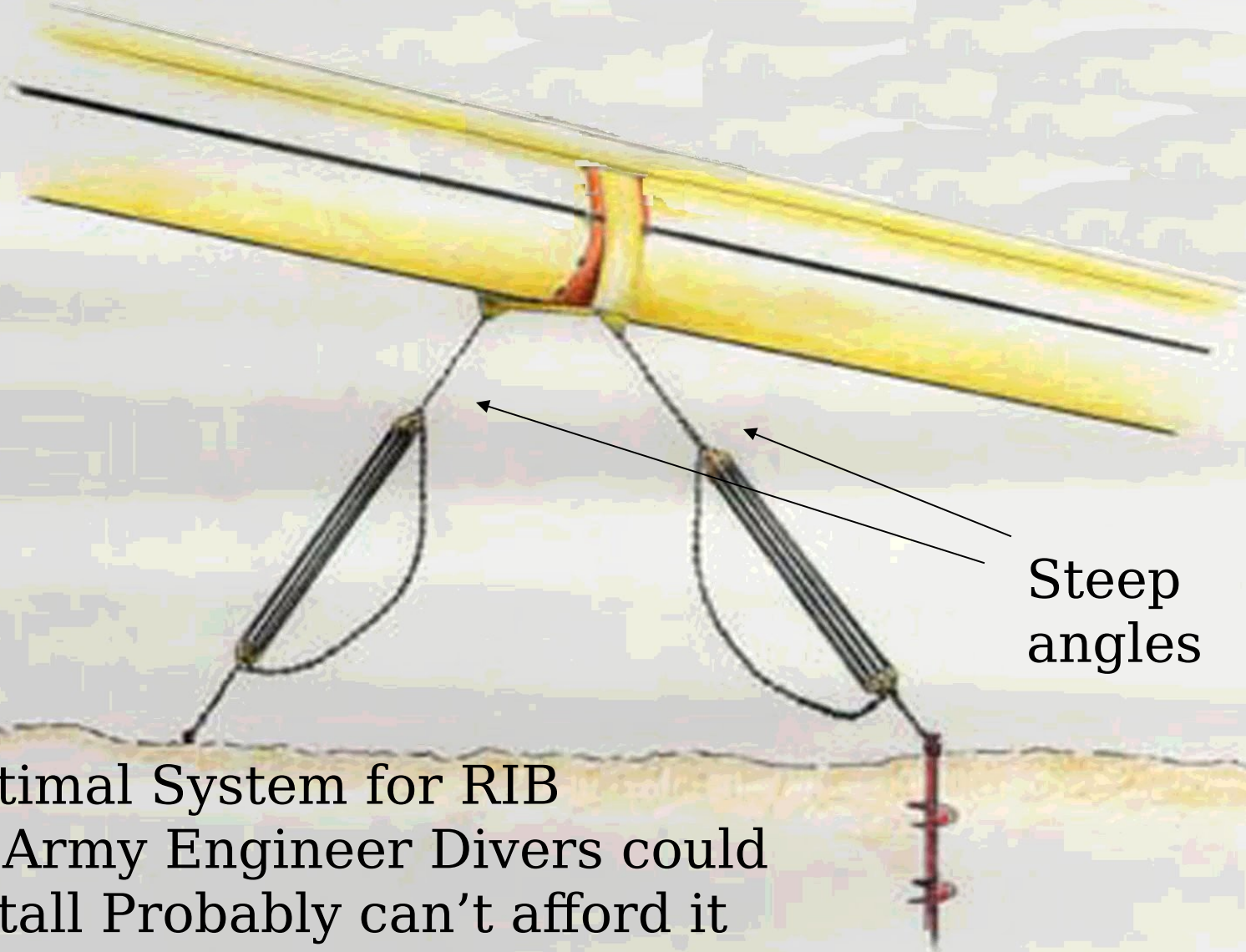


# Performance ....

**Incident Versus Transmitted Wave Energy  
FY 2000 RIB Field Study**



# Hurricane Mooring System for RIB



Optimal System for RIB

Army Engineer Divers could  
install Probably can't afford it  
for ATD demo



# **XM 2001 Field Study**

- Fort Pierce, FL ----- Cape Canaveral denied by 9/11
- 9 – 18 December 2001
- 28 ft diameter, 200 ft long segments
- 400 ft was delivered via 2 flatbed tra
- IPPD meeting conducted \_\_\_\_\_



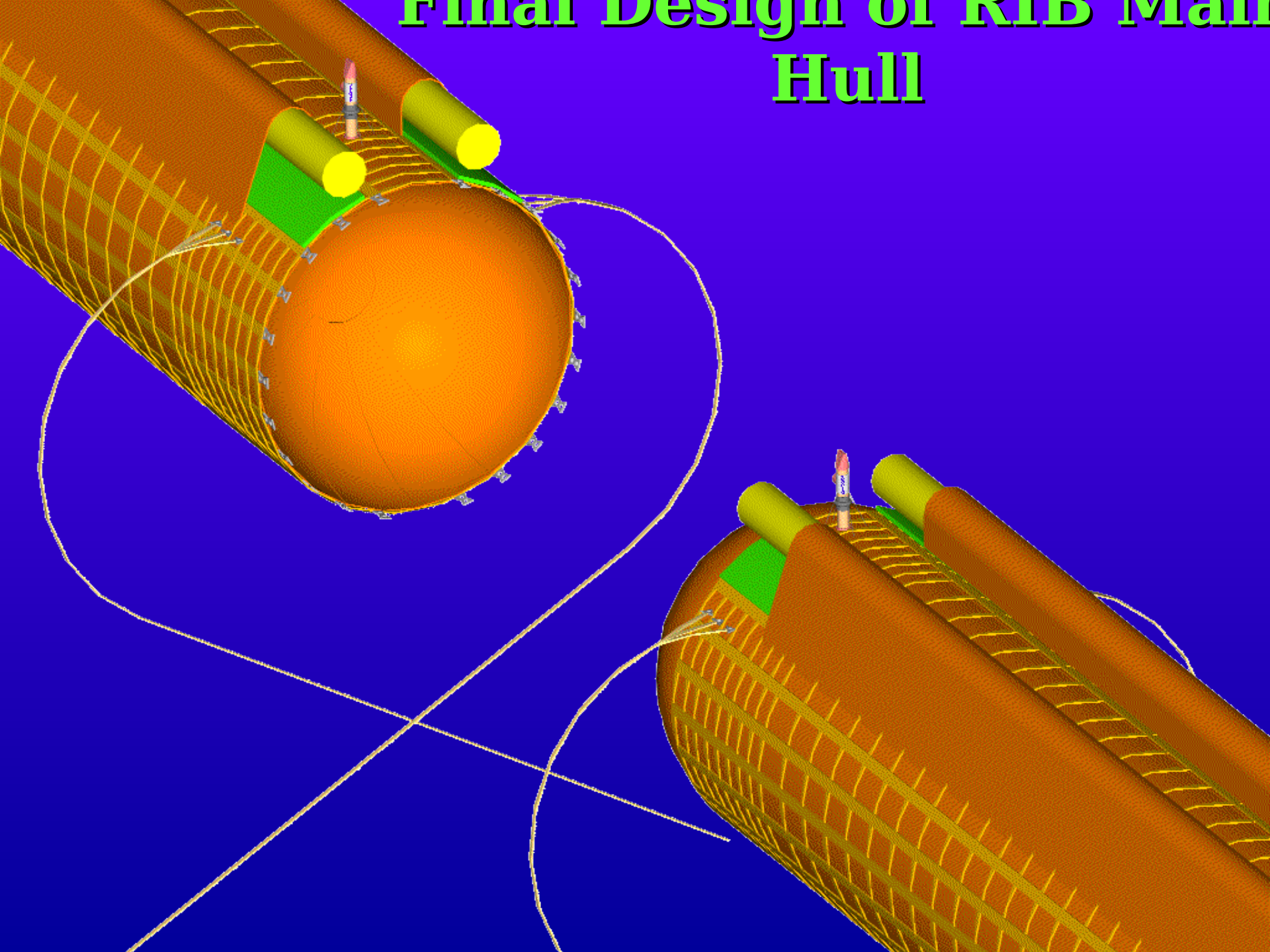
Photo by Angela White

## **Goals for XM-2001**

**Deployment** Deploy a single leg comprised of two conjoined Standard Hulls in order to:

- Gain experience on deployment and employment issues
- Evaluate the D & R Assembly functionality

# Final Design of RIB Main Hull







OCT 22 2001



# Fabrication of RIB Main Hull



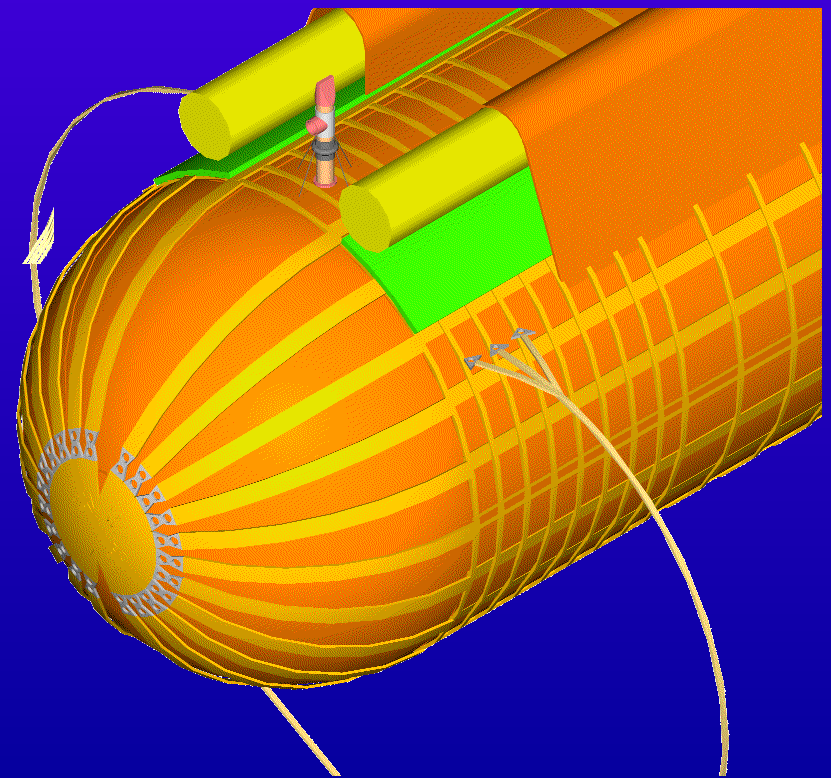
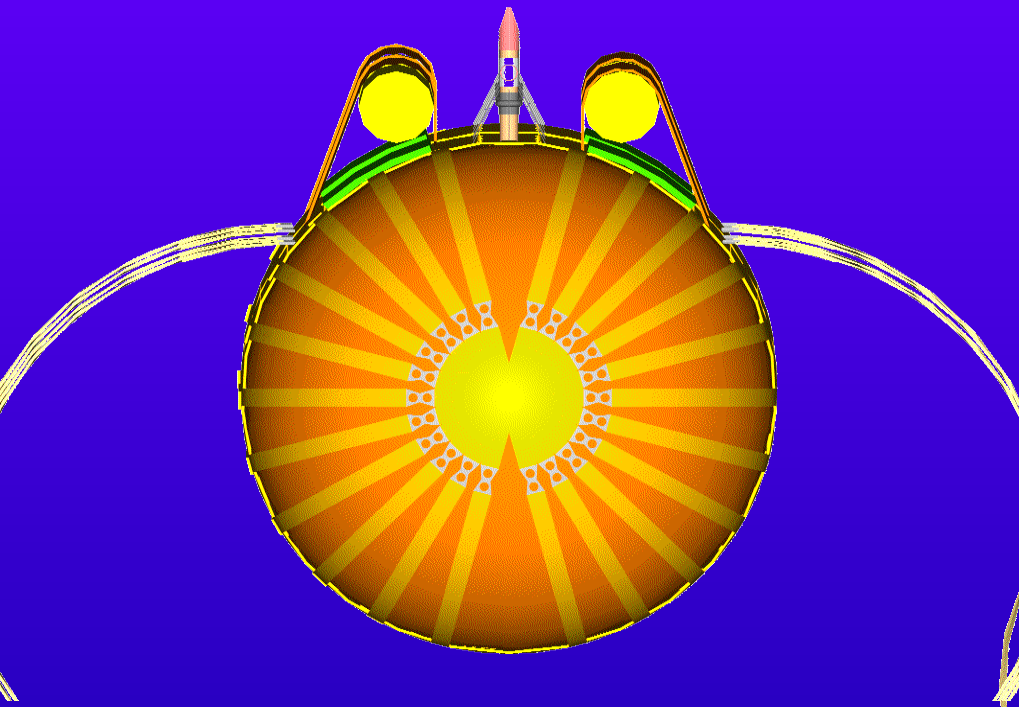




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# Final Design of KIB Main Hull







OCT 22 2001





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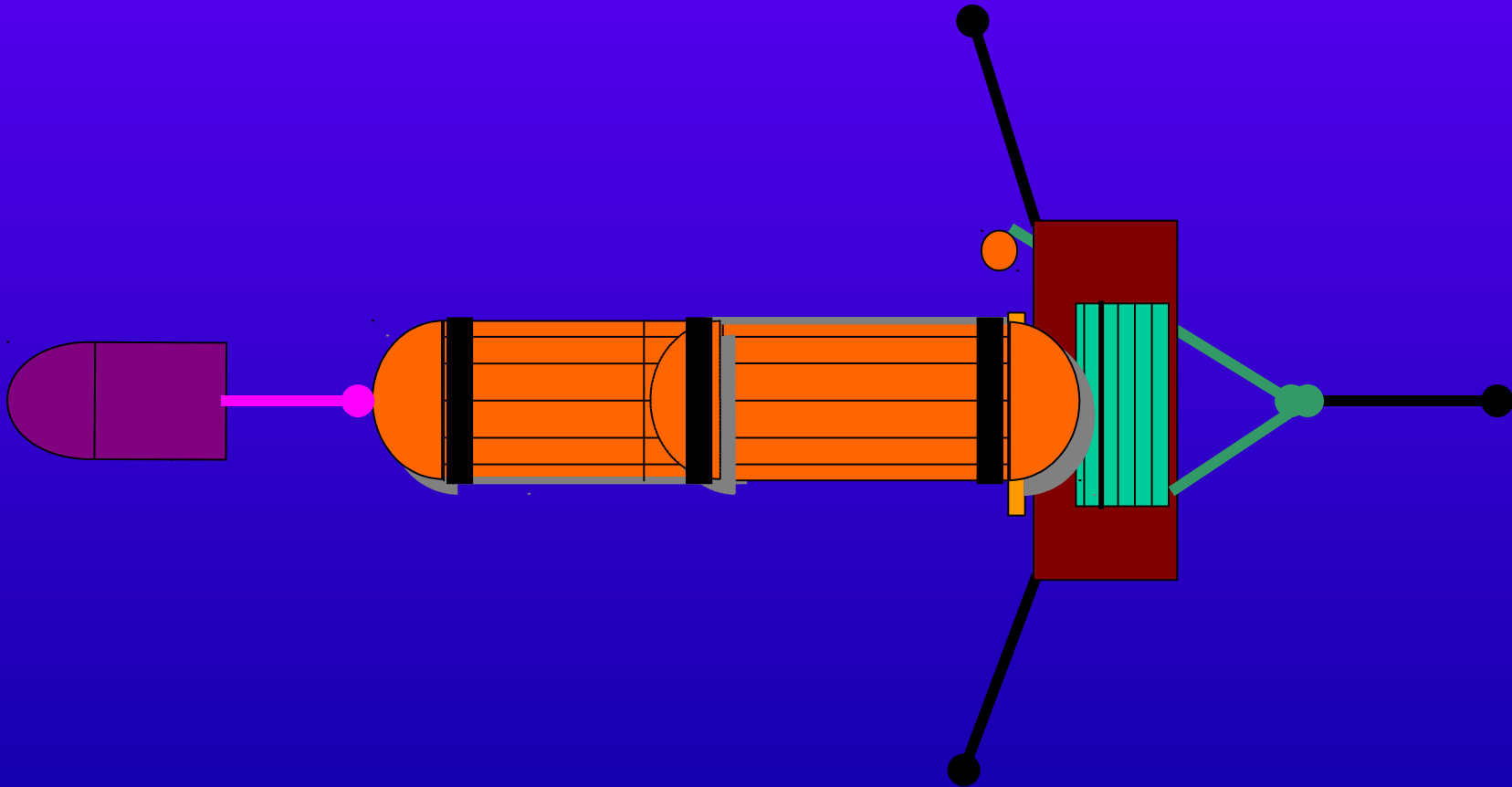
# FY01 ATD DELIVERY SYSTEM

With minor glitches, D & R performed as designed

- Will be further modified for ATD Demo



# Deployment Scheme





# DEPLOYMENT/RECOVER Y MECHANISM







# RIB XM 2001 Lessons Learned

## **GOOD**

- Deployment mechanism worked well – can simplify to work better
- Much more compact than originally thought - 200 ft on one flatbed
- Pressure relief design works well
- Fabric was very durable

# RIB XM 2001 Lessons Learned

## **COULD HAVE BEEN BETTER**

- Deployment procedure/sequence
- Test site
- Floatation to RIB attachment
- Tug operations
- Recovery procedures
- In situ decision making (training!!)



# 2002

- **FEB -JUN 02**      **Fabrication of Additional**      **Segments**
- **JUL/AUG 02 Assembly/ATD DEMO**    - JLOTS Vessel/Lighters  
participation            - East Coast USA - preferred location            - Test & Evaluation  
Community participation
- **SEP 02 Recovery & Redeployment**
- **OCT 02 Final Report Published**
- **OCT 02**            **Transition to TACOM for**      **EMD**

# RIB R&D Status Summary

- ORD (Army) was approved Jan 00
- Full Scale 400 ft RIB Section successfully deployed in 2001
- Final ATD demonstration – Test date to be announced; likely in mid to late August 2002 in Cape Canaveral, FL
- Exit Criteria will be evaluated
  - Barge mounted deployment mechanism will be demonstrated
  - Pressurization, inflation, & mooring times will be monitored
  - 28 ft diameter, 400 ft long segments
  - 800 ft will be delivered via 5 flatbed trailers
  - VIP invitations will be issued in June or early July 2002
- Working with Navy Coastal Systems Station (Panama City to investigate feasibility of Ship Attached RIB)



Questions ??

# Mooring Configuration

